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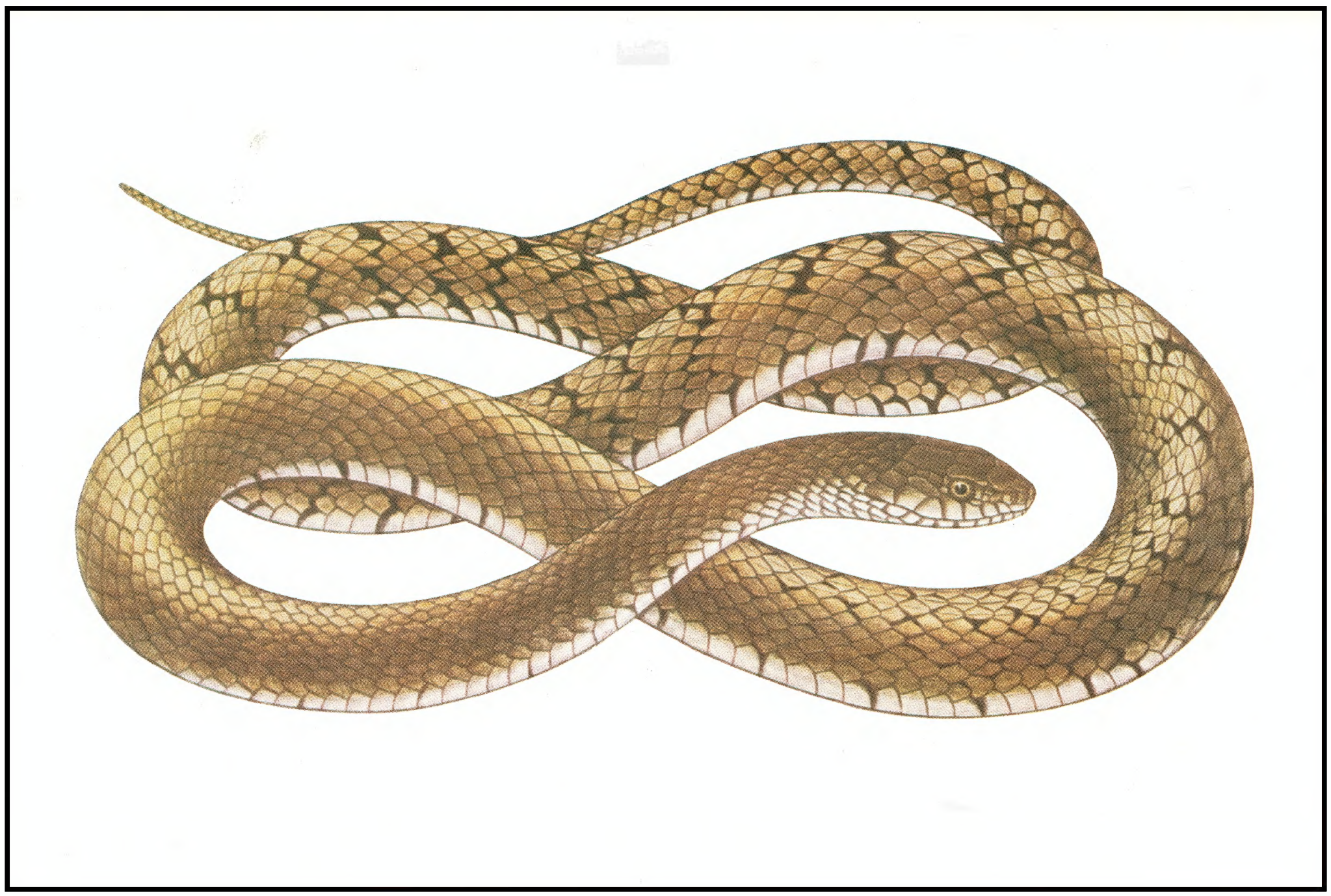

BULLETIN OF THE CHICAGO HERPETOLOGICAL SOCIETY
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Fall Courtship by Eastern Gartersnakes, *Thamnophis sirtalis sirtalis*, in South-Central Pennsylvania

Walter E. Meshaka, Jr.[1], Randy Cassell[2], Austin Cassell[3] and Morgan Cassell[2]

Fall mating in the Eastern Gartersnake, *Thamnophis sirtalis sirtalis*, in Pennsylvania occurs less commonly than in the spring, when mating aggregations can be large (Hulse et al., 2001). Male:female mating groups of 3:1 were observed on 24 September 2020 (Meshaka et al., 2024) and on 14 October 2020 (Meshaka et al., 2020). We report here another otherwise uncommonly reported incidence of fall courtship in this species in Pennsylvania. At approximately 1030 hrs on 7 October 2024, at a residential site in Camp Hill, Cumberland County, a group of three males and one female were found in physical contact with one another in a sunny spot on top of a grapevine (*Vitis* sp.), 3 m above the ground. The sky was nearly cloudless, and air temperature was approximately 70°F with little to no wind. Individual males were seen crawling about the female in halting, jerking movements (Figure 1). Copulation was not observed at that time. A return visit to the spot at 1545 hrs revealed only one male left with the female. At this time, they were resting in a semi-coiled position with one another in the sun. Quantifiable records of courtship can provide a useful measure of breeding response to climate change, as activity can begin earlier and end later in the season.

Figure 1. A courtship aggregation of three male and one female Eastern Gartersnakes, *Thamnophis sirtalis sirtalis*, in south-central Pennsylvania on 7 October 2024 (as seen from a ladder). Photograph by Randy Cassell.

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Notes on the Herpetofauna of Mexico 47: Observations on Feeding in Captivity by Pygmy Alligator Lizards, *Gerrhonotus parvus* Knight and Scudday, 1985 (Squamata: Anguidae)

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Introduction

The genus *Gerrhonotus* Wiegmann 1828 is endemic to North America and is represented by seven species: *G. farri* Bryson & Graham 2010, *G. infernalis* Baird 1859 (1858), *G. liocephalus* Wiegmann 1828, *G. lazcanoi* Banda-Leal, Nevarez de los Reyes and Bryson 2017 *G. lugoi*, McCoy 1970, *G. ophiurus* Cope 1866, and *G. parvus* (Knight & Scudday, 1985). The distribution of the group is complex; the larger species have broad ranges, and the smaller species are range-restricted. The most widely distributed species are *G. liocephalus* in western and southern Mexico and *G. infernalis* in central and northern Mexico and southern Texas (Good, 1994). The remaining five species have restricted distributions, known from small areas and only a few individuals. Relatively little is known about the biology of *G. farri*, *G. lazcanoi*, *G. lugoi*, and *G. parvus*. For *G. lugoi,* there is a report of reproduction in captivity, courtship, and litter size (Lazcano et al., 1993).

Gerrhonotus farri and *G. lazcanoi* are each known by a single specimen, with accordingly limited information for each species (Bryson and Graham, 2010; Banda-Leal et al., 2017). A specimen from Nuevo León previously identified as *G. lugoi* (Montoya-Ferrer et al., 2021) may actually correspond to *G. lazcanoi* (personal communication, Uri Garcia-Vasquez), and it is anticipated that results will be published upon further study. Despite extensive field and laboratory investigations, information regarding the diet of these species remains scant.

The pygmy alligator lizard, *Gerrhonotus parvus*, is a relatively small anguid in which the holotype, an adult female, measured 152 mm in total length (TL): the snout–vent length (SVL) = 55 mm + the tail length (TaL) = 97 mm (Knight and Scudday, 1985). This species can be differentiated from its congeners by a combination of the following characters: small adult size; smooth dorsal scales; nasals in contact with rostral, second primary temporal in contact with fifth medial supraocular; suboculars separated from lower primary temporal by an upper labial; and wide pale crossbands on the tail (Knight and Scudday, 1985).

Gerrhonotus parvus is known to occur in the Sierra Madre Oriental in the state of Nuevo León, Mexico, and originally was reported from the municipality of Galeana in a transition zone between pine forest (*Pinus arizonica*) and open gypsophyllous scrub at an elevation of 1650 m (Knight and Scudday, 1985). Subsequently, Banda-Leal et al., (2002) reported a specimen from Cañon de San Isidro in the municipality of Santiago, which is located northwest of the type locality. This canyon lies at an elevation of ca.1600 m and runs east to west; the canyon is characterized by steep limestone walls covered with agaves (*Agave lecheguilla, A. bracteosa*), sotol (*Dasylirion* sp.), and scrub oak (*Quercus* sp.) and contains intermittent pools of water. The floor of the canyon contains piles of leaf litter and scattered large rocks (Banda-Leal et al., 2002; Bryson and Lazcano, 2005). Conroy et al., (2005) reported another specimen of *G. parvus* from Cañon de Mireles in the municipality of Los Rayones, between the two areas indicated above. The habitat in Cañon de Mireles is similar to that of Cañon de San Isidro but the specimen was found at an elevation of 900 m, the lowest recorded for this species. Banda-Leal et al. (2014a) later reported another specimen in a similar habitat, from Cañon de Reflexiones in the municipality of Santa Catarina, which lies northwest of Cañon de San Isidro. The species was thought to be endemic for the state of Nuevo León, but Banda Leal et al. (2018) documented the species for the state of Coahuila, a state bordering Nuevo León to the west. Nuevo León is divided into seven physiographic regions. *Gerrhonotus parvus* inhabits one of these, the Gran Sierra Plegada, and is endemic to Mexico. The IUCN Red List conservation status for *Gerrhonotus parvus* is Least Concern (IUCN, 2023) and its EVS (*sensu* Wilson et al., 2013) is H (16), placing it in the middle of the high vulnerability category. This species has not been evaluated by the Mexican Ministry of Environment and Natural Resources, SEMARNAT (Nevárez-de los Reyes et al., 2016).

For *G. parvus*, there is more detailed information about its natural history (Bryson et al., 2003), as well as its, maximum size, litter size, sympatric herpetofauna, potential predators, and a very limited amount of information on its habitat and captive management (Banda-Leal et al., 2005; Banda-Leal et al., 2013, 2014a, b; Banda-Leal, 2016; Banda-Leal et al., 2018; Hernández-Bocardo and Lazcano, 2018; Lazcano et al., 2018; Lazcano et al., 2019). We have also paid attention to its thermal ecology (Lazcano et al., 2022), and documented a malformation of a wild-caught specimen (Lazcano et al., 2017).

In an effort to understand the feeding behavior of this anguid in captivity, we report the following observations

.

Material and Methods

Over the past 14 years, we have been working with different aspects of captive management of *G. parvus* (Esquivel-Arévalo, 2017; Hernández-Bocardo and Lazcano, 2018; Lazcano et al., 2019; Hernandez-Bocardo, 2019). We maintained nine adult *G.*

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Table 1. Initial and final lengths and weights of the specimens over the course of the observations. Lengths in millimeters and weights in grams.

Specimen number	Catalogue number	Sex	Initial				Final			
			Snout–vent length	Tail length	Total length	Weight	Snout–vent length	Tail length	Total length	Weight
1	8614	♂	67	26	93	4.50	67	28	95	5.34
2	7413	♂	70	85	155	6.59	70	87	157	7.23
3	8615	♂	81	27	108	9.48	81	28	109	8.27
4	8616	♀	84	80	164	9.70	84	81	165	9.49
5	8617	♂	85	74	159	8.98	86	75	161	9.94
6	8618	♀	71	62	133	8.07	71	62	133	8.07
7	8616	♀	87	80	167	7.60	87	81	16.8	7.34
8	Chipinque	♀	190	84	274	7.79	190	85	275	7.24
9	8620	♂	74	80	154	7.00	74	80	154	7.49

parvus individuals, four females (catalogue numbers 8616-4, 8618-6, 8616-7, Chipinque-8), and five males (catalogue numbers 8614-1, 7413-2, 8615-3, 8617-5, 8620-9). Individuals were housed separately in plastic containers (30" × 17" × 9") with distinct hot and cool areas, the former featuring a heat tape underneath (Figure 1). Data for the above-mentioned nine specimens during the observation period reported here are presented in Table 1, while feeding frequency per month is summarized in Table 2. The observation period spanned 198 days, from 27 January to 13 August 2021. The animals were fed on an irregular schedule due to their infrequent feeding behavior. During their captivity over the past 14 years they typically consumed food once or twice a week, but occasionally abstained from eating altogether for lengthy periods. This irregular feeding pattern posed a challenge. Throughout the observation period, each individual received 38 feeding attempts, consisting of various food items, including mealworms (*Tenebrio molitor*), crickets (*Acheta domesticus*), Madagascar hissing cockroaches (*Gromphadorhina portentosa*), lobster cockroaches (*Nauphoeta cinerea*), and waxworms (*Galleria mellonella*). All food items were supplemented with alternate dustings of finely powdered Repashy Super Food (Repashy Ventures, Inc. Oceanside, California, 92056) and Revipet Vitamins and Minerals (PETMMAL S.A. DE C.V., Cuautitlán Izcalli, Estado de México, México).

Figure 1. View of a housing unit with one of the captive individuals on top of the artificial shelter. Photograph by Héctor A. Vargas-Ramírez.

Results

During the period from 27 January 2021 to 15 August 2021, we obtained the following results, which will assist in our understanding and diagnosis of the feeding biology and behavior of the species. We recorded 38 feeding attempts during these months. Table 2 presents data from the beginning to the end of the experiment for nine individuals of *Gerrhonotus parvus*. Feeding was conducted using a personalized approach, where

Table 2. Feedings per month.

Month	Number of feeding attempts
January	2
February	6
March	5
April	4
May	6
June	5
July	6
August	4

Table 3. Successful feedings out of 38 attempts for each of the nine captive specimens, ordered from highest to lowest acceptance.

Specimen number	Successful attempts
5	32 (84.2%)
6	32 (84.2%)
1	27 (71.1%)
3	27 (71.1%)
9	27 (71.1%)
4	25 (65.8%)
2	19 (50.0%)
7	15 (39.5%)
8	14 (36.8%)

various food items were held with tweezers and offered directly to the specimens. We observed each specimen until the food items were seized and consumed. Each specimen underwent 38 feeding attempts totaling 342 trials, of which 218 were successful (63.7%) and 124 were unsuccessful (36.3%). As a group, the five males accepted food in 132 of 190 feeding attempts, a frequency of 69.5%. As a group, the four females accepted food in 86 of 152 feeding attempts, a frequency of 56.6%. Numbers of successful feedings for each of the nine specimens are shown in Table 3.

The bar graph in Figure 2 summarizes the individual feeding behavior with respect to the different food items. Table 4 compares feeding frequencies between the warm and cool cage sections for each of the nine captive *Gerrhosaurus parvus* specimens.

Our results were derived from purely observational work. We observed the individuals in captivity, counted the feeding frequencies of different food items, and recorded the temperatures

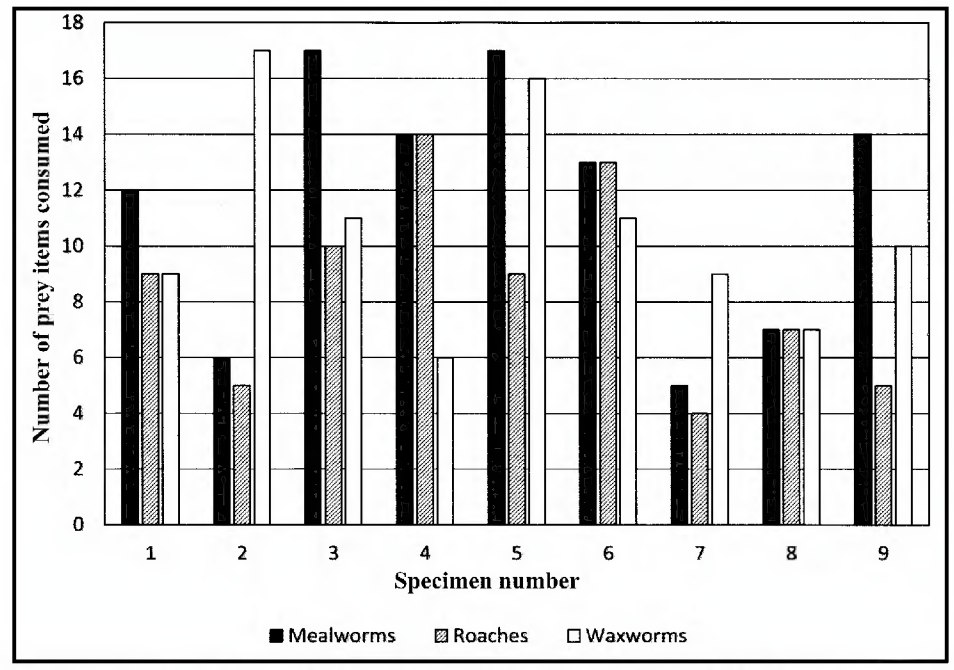

Figure 2. Food items consumed by each of the nine individual specimens over the course of the 198-day observation period.

in each experimental unit. We did not apply any statistical tests to our data, focusing instead on the averages of positive and negative feeding attempts of the nine captive specimens to gain insight into their preferences for the different food items used in this experiment.

Discussion and Conclusions

The maintenance of many lizard species in captivity poses significant challenges, particularly for those that are not commercially available, such as the species under investigation here. Despite extensive documentation of their biology and behavior in both wild and captive settings since their initial description by Knight and Scudday (1985), specific dietary information remains elusive. Understanding an animal's energy intake is crucial for comprehending its feeding requirements for survival and evolutionary success (Nagy et al., 1999; Nagy, 2001). Equally important is identifying the prey items that the species accepts or prefers (Reznick et al., 1981), a topic not yet explored in our laboratory.

Table 4. Feeding frequencies and average temperatures (°C) for feeding attempts taking place in the warm and cool cage sections.

Specimen number	Section 1 (warm)		Section 2 (cool)	
	Ratio of successful feedings to attempts	Average temperature during feeding attempts	Ratio of successful feedings to attempts	Average temperature during feeding attempts
1	3/6 (50%)	34.3	24/32 (75%)	24.7
2	1/3 (33%)	39.7	18/35 (51%)	25.3
3	3/3 (100%)	39.1	24/35 (69%)	24.3
4	0/1 (0%)	35.0	25/37 (68%)	24.3
5	6/7 (86%)	38.0	26/31 (84%)	24.0
6	0/0	–	32/38 (84%)	24.0
7	1/7 (14%)	38.5	14/31 (45%)	25.0
8	1/2 (50%)	30.4	13/36 (36%)	24.3
9	2/4 (50%)	30.9	25/34 (74%)	24.2
All	17/33 (52%)	36.3	201/309 (65%)	24.4

Figure 3. Three of the captive pygmy alligator lizards, *Gerrhonotus parvus*, used for the observations reported here. The specimen on the right is a male. Photographs by Michael S. Price.

Notably, two significant studies have been conducted on this species in captivity since our research began. These studies, authored by Esquivel-Arévalo (2017) and Hernández-Bocardo (2019), focused on the use of artificial shelters in rocky substrates, complementing previous observations of their behavior in the wild (Bryson et al., 2003; Banda-Leal, 2016), but have not addressed dietary preferences. Our hope is that the results of our experiment will provide insights into the feeding frequency of these lizards.

It is well-established that *Gerrhonotus parvus* is a cool-dwelling anguid species (Lazcano et al., 2022), a characteristic observed in our results. However, crucial aspects such as their natural dietary preferences and the potential negative impacts of an unfamiliar diet during development remain unclear. Palatability could significantly influence their acceptance of certain food items. We are also aware that for lizards, diets made up of a single food item type are known to be detrimental.

Unfortunately, essential information regarding the lifespan of this species in both wild and captive environments remains unknown.

One critical observation pertains to a recent meteorological event in our region: Tropical Storm Albert (17–20 June 2024) traversed Nuevo León, resulting in substantial precipitation. The Cañon de San Isidro area in Santiago, Nuevo Leon, where these animals reside, experienced severe impacts, including extensive flooding. The potential effects on the species remain uncertain pending a survey. Currently, all access roads to San Isidro are inaccessible.

Acknowledgments

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Notes on Reproduction of Northern Cricket Frogs, *Acris crepitans* (Anura: Hylidae), from North Carolina

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Abstract

I conducted a histological examination of gonads from 27 *Acris crepitans* from North Carolina. Males contained sperm from all months examined: January to September. The smallest mature male (sperm in lumina of seminiferous tubules) measured 18 mm SVL. The smallest mature females (spawning condition) measured 23 mm SVL. My findings of reproductively active males (spermiogenesis) from four seasons and reproductively active females in spawning condition from March to July support previous findings that *A. crepitans* reproduces in spring and summer (see Dodd, 2023).

The northern cricket frog, *Acris crepitans* Baird, 1854 (*sensu* Gamble et al., 2008), occurs from southeastern New York to western Florida, to southeastern Louisiana, northward through Tennessee to Kentucky (Frost, 2024). *Acris crepitans* is listed as a species of Least Concern because of its wide distribution, tolerance of some habitat modification and presumed large population (IUCN SSC Amphibian Specialist Group, 2022). It is a mostly upland species. Individuals spend most of their lives near breeding ponds and do not move far from water; activity occurs year-round as long as environmental conditions allow (Dodd, 2023). In North Carolina they call from April to August (Dorcas et al., 2007). In this paper, I present data from a histological examination of *A. crepitans* gonads from North Carolina.

A sample of 27 *A. crepitans* from North Carolina (Appendix) collected 1933 to 2006 consisting of 14 males (mean snout–vent length, SVL = 21.6 mm ± 1.7 SD, range = 18–23 mm) and 13 females (mean SVL = 25.2 mm ± 2.2 SD, range = 23–29 mm) was examined from the herpetology collection of the North Carolina State Museum (NCSM), Raleigh, North Carolina, USA. Utilization of museum specimens for obtaining reproductive information avoids removing additional animals from the wild.

A small incision was made in the lower part of the abdomen and the left testis was removed from males and a piece of the left ovary from females. Gonads were embedded in paraffin. Histological sections were cut at 5 μm and stained with Harris hematoxylin followed by eosin counterstain (Presnell and Schreibman, 1997). Histology slides were deposited at NCSM. An unpaired *t*-test was used to test for differences between male and female SVLs .

The testicular morphology of *A. crepitans* is similar to that of other anurans as described in Ogielska and Bartmańska (2009a). Within the seminiferous tubules, spermiogenesis occurs in cysts which are closed until the late spermatid stage is reached; cysts then open and differentiating sperm reach the lumina of the seminiferous tubules (Ogielska and Bartmańska, 2009a). There was typically a tangled mass of spermatozoa in the lumen of the seminiferous tubule and a ring of germinal cysts located on the inner periphery of each tubule. All 14 *A. crepitans* testes examined were undergoing spermiogenesis: January (N = 1), March (N = 1), April (N = 1), May (N = 3), June (N = 3), July (N = 3), September (N = 2). The smallest mature male (undergoing spermiogenesis) of *A. crepitans* measured 18 mm SVL (NCSM 33075) and was from January. Wright and Wright (1949) reported *A. crepitans* (as *A. gryllus crepitans*) males were mature at 17–18 mm.

The mean SVL of *A. crepitans* females was significantly larger than that of males ($t = 4.6$, df = 25, $P < 0.0001$). The ovaries of *A. crepitans* are similar to those of other anurans in being paired organs lying on the ventral sides of the kidneys; in adults the ovaries are filled with diplotene oocytes in various stages of development (Ogielska and Bartmańska, 2009b). Ripening follicles contain varying amounts of basophilic = vitellogenic granules. Mature oocytes are filled with yolk droplets; the layer of surrounding follicular cells is thinly stretched. Three stages were present in the spawning cycle (Table 1): (1) Vitellogenic (oocytes incorporating yolk); (2) Ready to spawn, in which mature oocytes predominated; (3) Not in spawning condition, in which pre-vitellogenic oocytes predominated. The three smallest *A. crepitans* females in spawning condition measured 23 mm SVL (NCSM 56863, 72034, 72037) and were from April, June and July, respectfully. Wright and Wright (1949) reported *A. crepitans* (as *A. gryllus crepitans*) females were mature at 20 mm.

Six of the 13 (46%) *A. crepitans* in my female sample (NCSM 18305, 18306, 29811, 37494, 39337, 72037) contained atretic oocytes. Atresia is a widespread process occurring in the ovaries of all vertebrates (Uribe Aranzábal, 2009). It is common in the amphibian ovary (Saidapur, 1978) and is the spontaneous

Table 1. Conditions in the spawning cycle of 13 adult *Acris crepitans* females from North Carolina.

Month	*n*	Ripening (vitellogenic)	Ready to spawn	Not in spawning condition
March	2	1	0	1
April	3	0	3	0
May	3	0	3	0
June	2	0	2	0
July	1	0	1	0
August	1	0	0	1
October	1	0	0	1

Table 2. Months of breeding by state for *Acris crepitans*.

Locality	Breeding Period	Source
Alabama	April, May, June	Mecham, 1964
Alabama	March to July or August	Guyer and Bailey, 2020
Carolinas and Virginia	Calls April to August	Beane et al., 2010
Delmarva	Late spring into summer	White and White, 2007
Florida	March to June	Krysko et al., 2019
Georgia	March, April to August	Jensen et al., 2008
Kentucky	April into summer	Barbour, 1971
Louisiana	March to September	Dundee and Rossman, 1989
Maryland	March through July	Hildebrand, 2018
New Jersey	April to June	Schwartz and Golden, 2002
New York	call May to July	Gibbs et al., 2007
Pennsylvania	call May to August	Hulse et al., 2001
Southeast	early spring into autumn?	Dorcas and Gibbons, 2012
Tennessee	mid spring to late summer	Niemiller and Reynolds, 2011
Virginia	April to July	Mitchell, 1986
West Virginia	May to July	Dodd, 2023

digestion of a diplotene oocyte by its own hypertrophied and phagocytic follicle cells which invade the follicle and eventually degenerate after accumulating dark pigment (Ogielska and Bartmańska, 2009b). See Saidapur and Nadkarni (1973) and Ogielska et al. (2010) for a detailed description of the stages of follicular atresia in the frog ovary. Atresia may influence the number of ovulated oocytes (Uribe Aranzábal, 2011) and can remove females from the breeding population (Goldberg, 2019). One *A. crepitans* from March (NCSM 29811) that was not in spawning condition (Table 1) contained abundant follicles in advanced atresia in which ooplasm of follicles was filled with vacuoles. Remaining follicles were non-vitellogenic.

In conclusion, my findings of reproductively active males (spermiogenesis) from four seasons and one female in spawning condition from July (Table 1) support findings of others (see Dodd, 2023) that *A. crepitans* reproduction occurs in spring and summer (Table 2).

Acknowledgments

I thank Bryan Stuart (NCSM) for permission to examine *A. crepitans* and Jeff Beane (NCSM) for facilitating the loan: HERP-346.

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Appendix

Twenty-seven *A. crepitans* from North Carolina (NCSM) examined (by county) from the herpetology collection of the North Carolina State Museum (NCSM), Raleigh, North Carolina, USA. **Bladen:** 66097; **Cabarrus:** 47822, 47824, 56837, 56876; **Caswell:** 24914, 67645; **Cumberland:** 37494; **Granville:** 54778, 72034, 72035; 72037; **Guilford:** 39337**; Harnett:** 56921; **Henderson:** 33075; **Johnston:** 19967, 23743, 24118; **Mecklenburg:** 56863; **Orange:** 18305, 18306; **Person:** 29811; **Randolph:** 10178; **Union:** 56897**; Wake:** 1947, 71274, 71275.

Herpetology 2024

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

BALL PYTHON SOCIABILITY

M. Skinner et al. [2024, Behavioral Ecology and Sociobiology 78(113)] note that it has been suggested that social behavior in squamates evolved partly due to increased interaction opportunities at communal dens and/or due to vivipary. Ball pythons are not viviparous, are not known to communally den, and are often assumed to be non-social. However, as ball pythons are highly cryptic, little is actually known about their social behavior. The authors examined social interactions and their relationship to personality in juvenile ball pythons (*Python regius*; n = 30) and found evidence, contrary to expectations, that they are highly gregarious. They tested snakes in both an aggregation assay and in individual personality tests. For the aggregation assay, 5 separate mixed-sex groups of 6 snakes were tracked in a large arena for 10 days. For the personality tests, snakes were tested alone for boldness and sociability. The authors assessed the snakes' social interaction patterns within and between the group and individual assays. They found that ball pythons spent much of their time in one large aggregate and used a home base to facilitate social interaction. The snakes were less consistent in their behavior during individual testing, resulting in flexible, rather than consistent, behavior across contexts. Social complexity is thought to determine the number and nature of social interactions between conspecifics, which often results in only testing species that exhibit highly visible social behaviors. These findings demonstrate that such biased sampling, which often ignores cryptic behavior, provides an incomplete picture of the biological and ecological factors that influence social behavior.

REPRODUCTIVE ISOLATION IN ANOLES

J. Torres [2024, Ichthyology & Herpetology 112(2):168-179] notes that species-level diversification (speciation) results from the evolution of reproductive isolation. When reproductive isolation is intrinsic (independent of ecological context), speciation is thought to be irreversible. Intrinsic reproductive isolation manifests as a reduction in hybrid fitness due to Dobzhansky-Muller incompatibilities, and can render hybrids sterile or inviable. During fieldwork in western Cuba, the author identified abnormal-looking individuals with small gonads within an assemblage of *Anolis*. He hypothesized that such individuals were interspecific hybrids and predicted a phenotypic distinctness and lower reproductive fitness. He evaluated these predictions by comparing putative hybrids with candidate parental species in external phenotypic traits and gonadal indicators of reproductive fitness. He found that putative hybrids were phenotypically distinct and did not produce sperm cells, suggesting that hybrid sterility may be important in maintaining species boundaries in this ecologically complex system.

DECLINE OF THE NEUSE RIVER WATERDOG

E. W. Teitsworth et al. [2024, Ichthyology & Herpetology 112(2):196-209] note that the lack of demographic data for many protected species often means that threats are poorly understood during recovery planning, and this results in difficulty defining sufficient metrics for assessing progress on recovery actions. The Neuse River waterdog (*Necturus lewisi*) is a federally protected aquatic salamander endemic to the Neuse and Tar-Pamlico River basins of central and eastern North Carolina. It has quietly declined during four decades of intense urbanization, but the specific drivers of decline are unclear because there are no demographic data and only limited detection/non-detection information available. The authors' first objective was to clarify the drivers of decline by synthesizing the current knowledge of the hypothesized threats to *N. lewisi*. Because preexisting demographic data are lacking, they used prior natural history research and studies of ecologically similar species to develop hypotheses for the observed declines in occurrence. The second objective was to update the knowledge of the species' current distribution throughout its historical range and then test the hypothesized threats using new occurrence data. They conducted detection/non-detection surveys across 116 locations throughout the species' historical range in two consecutive winter seasons (2018–2019 and 2019–2020) and modeled the effects of local and landscape variables representing three broad threat categories (pollution, flow suppression, and land use/land cover) using an occupancy modeling approach. They fit models representing all biologically relevant combinations of variables simultaneously, recognizing that threats are not independent in their effect. Dominant substrate type was the best predictor of occurrence and was negatively associated with the transition from cobble to silt ($P < 0.05$). This analysis most supported the hypothesis that observed declines in the occurrence of *N. lewisi* are a delayed result of sedimentation-induced recruitment limitation. Uncertainty in the mechanism of decline remains because recruitment limitation could not be directly estimated with two years of occurrence data, yet this interpretation gained through an understanding of the species' underlying biology and current distribution contributes to the knowledge about present threats and will help guide and evaluate future recovery actions for this protected and narrowly endemic aquatic species.

Bulletin of the Chicago Herpetological Society 59(11):155-156, 2024

Herpetological Art in Ripley's Aquarium of the Smokies—June 18, 2024

Photos and story by
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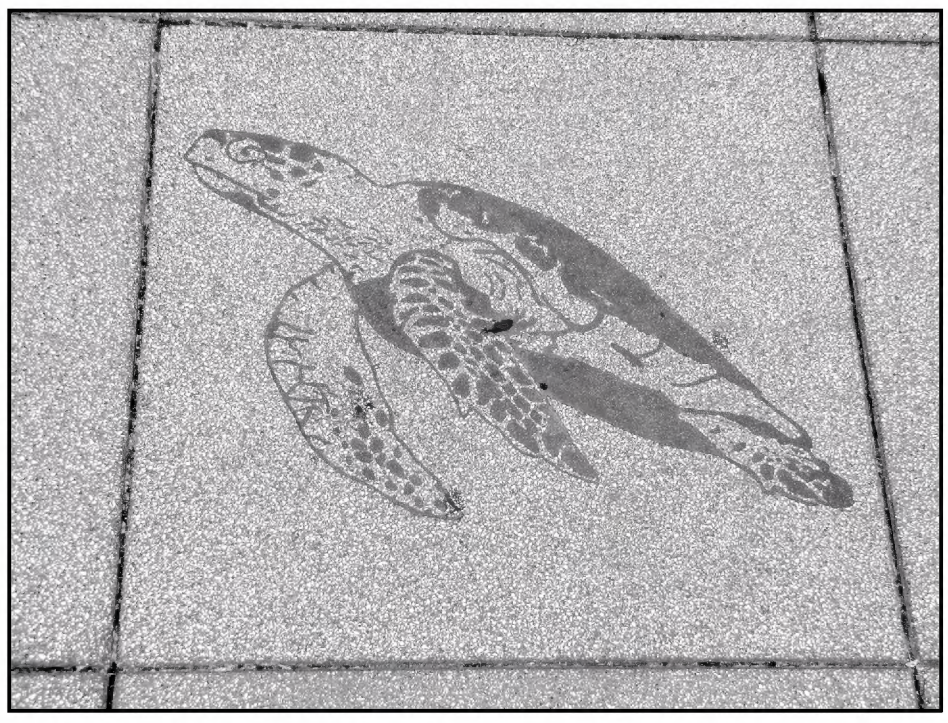
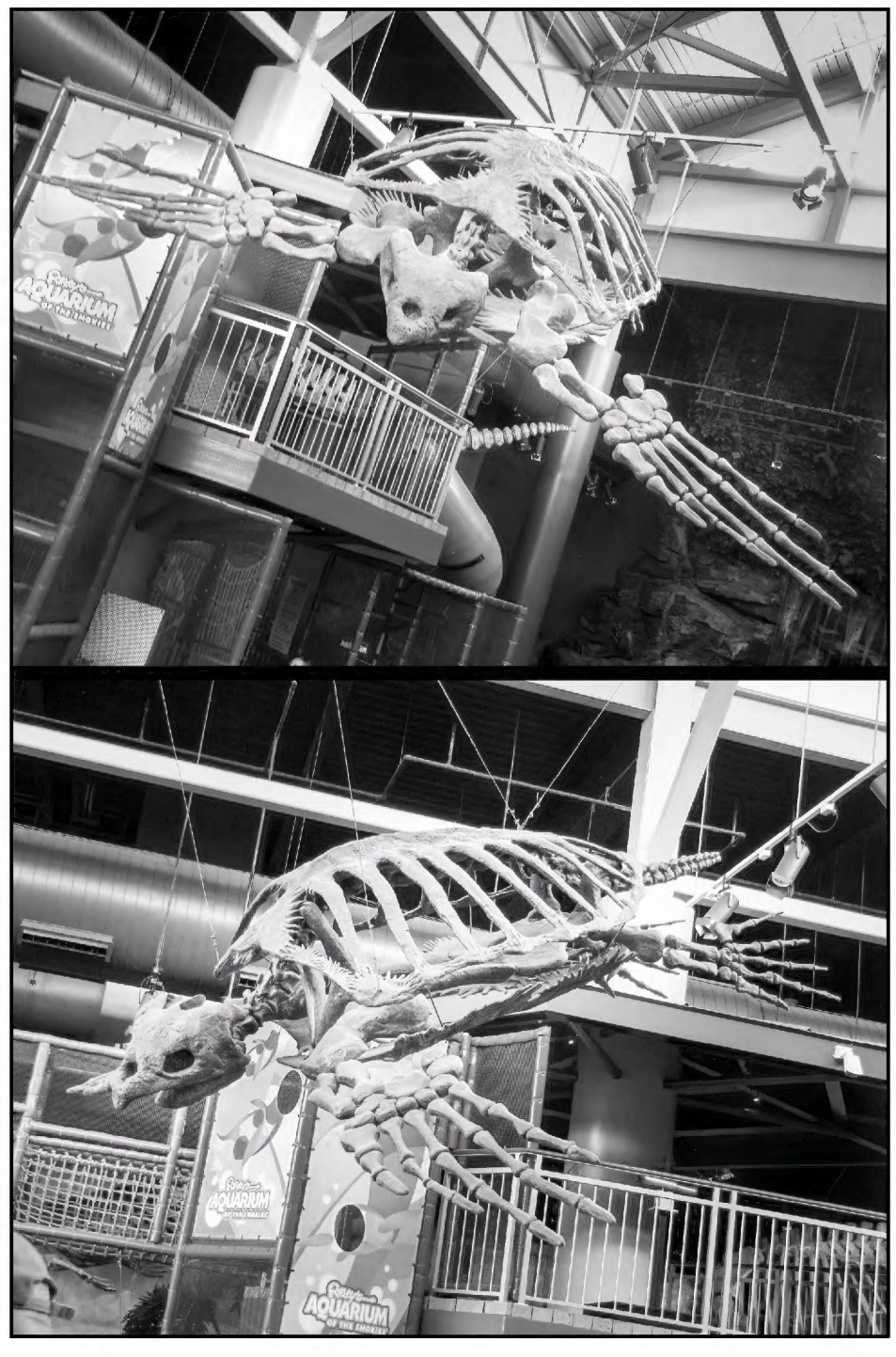
Zionsville, IN 46077
drymarchonzz@hotmail.com

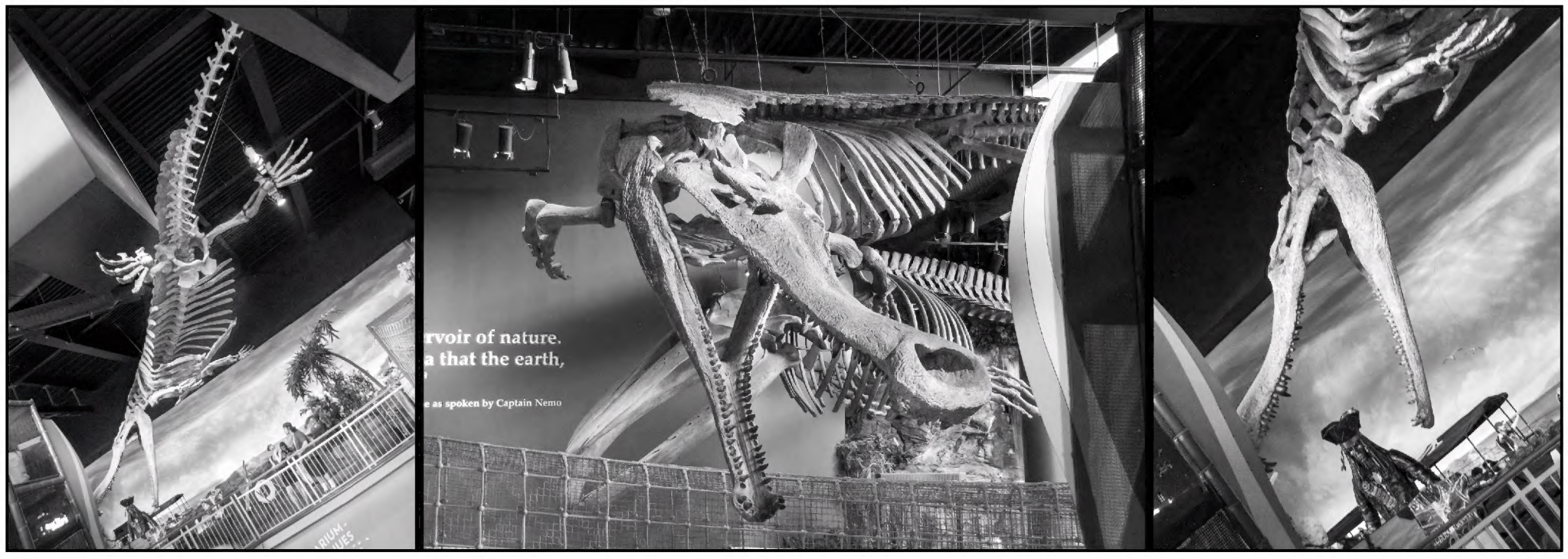
While in the Knoxville, Tennessee, area for the International Herpetological Symposium, my wife Holly and I also stopped at the Ripley's Aquarium of the Smokies in Gatlinburg, Tennessee. With over 10,000 sea creatures consisting of 350 species, the aquarium is accredited by the Association of Zoos and Aquariums. Their web site is: ripleysaquariumofthesmokies.com.

Inside the aquarium hangs a replica of a prehistoric sea turtle, identified by a sign that reads "The largest sea turtle to ever swim the world's oceans was the *Archelon ischyros* of the late Cretaceous era, 77 million years ago. The authentic casting, hanging above, measuring 13' long by 17' wide, was made from a specimen found in South Dakota, proving that much of America's Great Plains was once covered with salt water."

At the entrance to the aquarium there are blocks on the pavement. Most of these blocks are blank but some of them have the image of an octopus on them and some have the image of a sea turtle on them. All of these blocks are approximately thirty inches square.

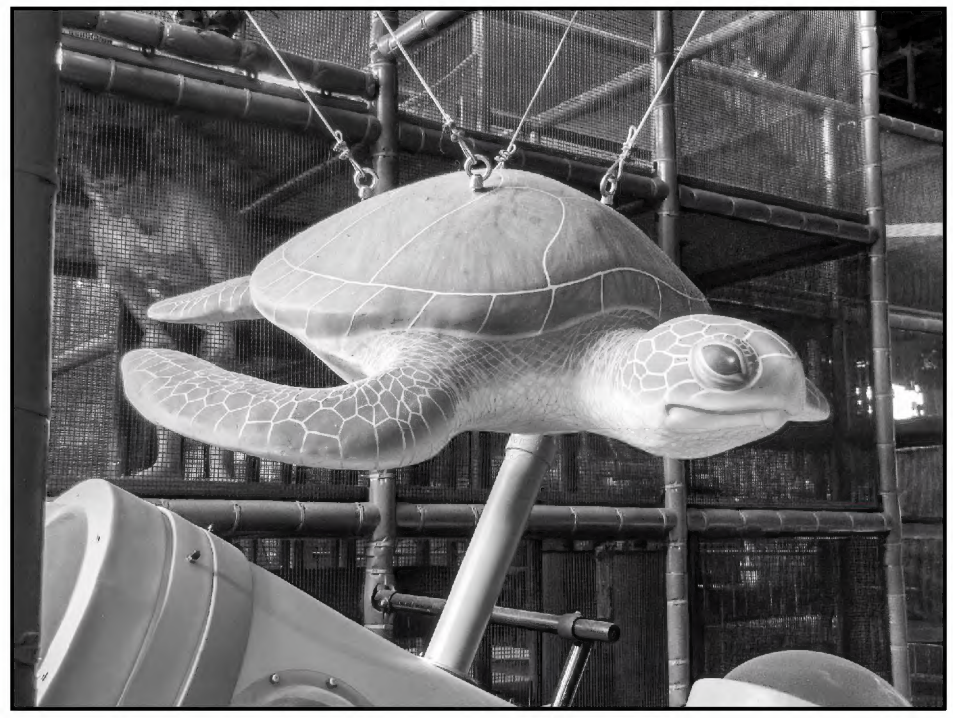






Also suspended from the ceiling is a replica skeleton of a prehistoric crocodile that has been nicknamed SUPERCROC. There is a sign that reads "The largest crocodile to roam the Earth didn't just live with the dinosaurs, it ate them! The *Sarcosuchus imperator*, nicknamed SuperCroc, grew up to 40 ft long, weighed over 17,500 lbs, and ruled the rivers of Africa during the Cretaceous Period over 110 million years ago!"

A life-sized replica of what may be a green sea turtle, *Chelonia mydas*, was also hanging from the ceiling. There were no signs identifying this replica.



Minutes of the CHS Board Meeting, October 18, 2024

A virtual meeting of the CHS board of directors via Zoom conference video/call was called to order at 7:00 P.M. Board members Kyle Houlihan and Margaret Ann Paauw were absent. Bob Hansen also attended. Minutes of the September 11 board meeting were read.

Officers' Reports

Treasurer: Rich Crowley reviewed the September financial reports. Fund-raising options were discussed.

Media secretary: Gaby Evans reported that people are responding on Facebook the most. We need to post events more than a week out. Gaby's time as media secretary is coming to an end.

Membership secretary: Mike Dloogatch read the list of those whose memberships recently expired.

Sergeant-at-arms: Twenty-three people attended the September 18 meeting at the Elgin Math and Science Academy (EMSA).

Committee Reports

Shows: Rosehill Cemetery Twilight Nature Walk, 5 – 8 P.M., October 29.
Museum of Science and Industry tree-lighting ceremony, 10 A.M. – 3 P.M., November 16.

Junior Herpers: Caitlin reported attendance in the high 20s at the September 15 meeting. The October meeting will be Halloween fun. Caitlin will bring her reptile skull collection.

Old Business

We need to confirm dates for upcoming meetings at EMSA.

The meeting adjourned at 8:22 P.M.

Respectfully submitted by Gail Oomens

UPCOMING MEETINGS

The CHS will not hold a monthly meeting in November. We will no longer be holding our monthly meetings at the Elgin Math and Science Academy.

All CHS members are invited to join the Junior Herpers for a holiday gathering at the Notebaert Nature Museum, 2430 N. Cannon Drive, Chicago, on Sunday, December 15, starting at 1:00 P.M. The CHS will provide soft drinks and snacks. If you would like to bring something edible to share with the group, please do.

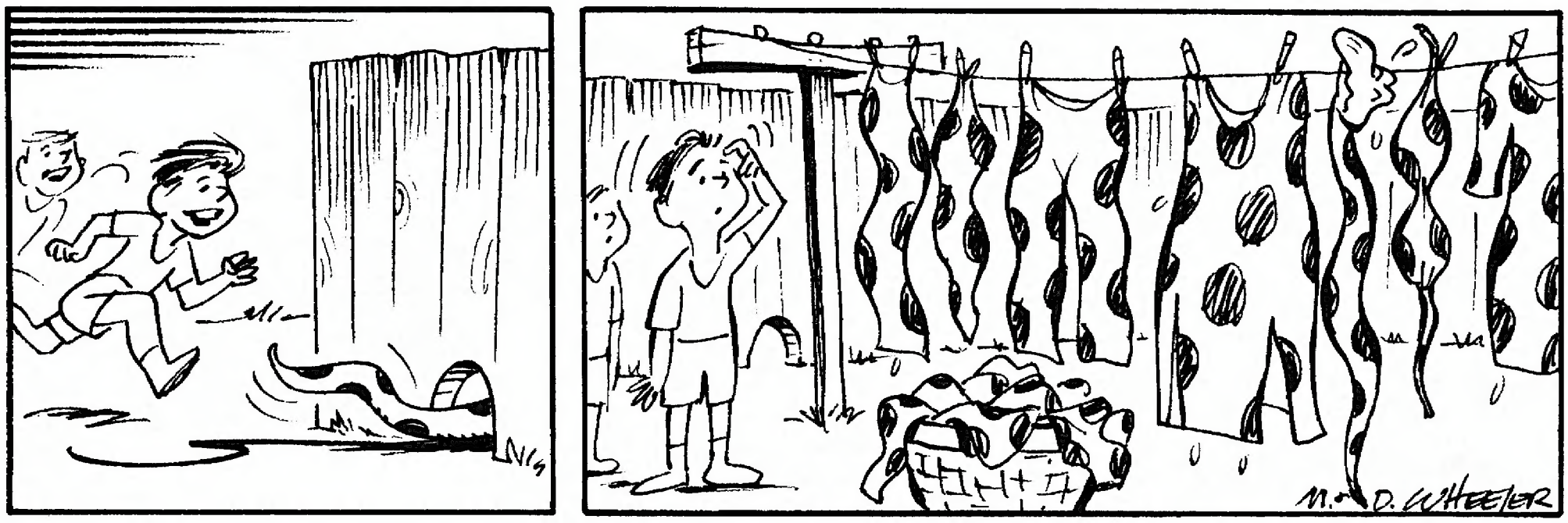
Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? The next board meeting will be held at EMSA. If you wish to attend in person or via Zoom, please email: rcrowley@chicagoherp.org.

NEW CHS MEMBERS THIS MONTH

Timothy R. Guy

THE ADVENTURES OF SPOT



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